

## ARTIFACT SHEET

Enter artifact number below. Artifact number is application number + artifact type code (see list below) + sequential letter (A, B, C ...). The first artifact folder for an artifact type receives the letter A, the second B, etc..  
Examples: 59123456PA, 59123456PB, 59123456ZA, 59123456ZB

09891925 BA

Indicate quantity of a single type of artifact received but not scanned. Create individual artifact folder/box and artifact number for each Artifact Type.

☐

CD(s) containing:

computer program listing

Doc Code: Computer

pages of specification

and/or sequence listing

and/or table

Doc Code: Artifact

content unspecified or combined

Doc Code: Artifact

☐

Artifact Type Code: P

☐

Artifact Type Code: S

☐

Artifact Type Code: U

☐

Stapled Set(s) Color Documents or B/W Photographs

Doc Code: Artifact    Artifact Type Code: C

☐

Microfilm(s)

Doc Code: Artifact    Artifact Type Code: F

☐

Video tape(s)

Doc Code: Artifact    Artifact Type Code: V

☐

Model(s)

Doc Code: Artifact    Artifact Type Code: M

☒

Bound Document(s)

Doc Code: Artifact    Artifact Type Code: B

☐

Confidential Information Disclosure Statement or Other Documents marked Proprietary, Trade Secrets, Subject to Protective Order, Material Submitted under MPEP 724.02, etc.

Doc Code: Artifact    Artifact Type Code X

☐

Other, description: \_\_\_\_\_

Doc Code: Artifact    Artifact Type Code: Z

# The United States of America



## The Commissioner of Patents and Trademarks

*Has received an application for a patent for a new and useful invention. The title and description of the invention are enclosed. The requirements of law have been complied with, and it has been determined that a patent on the invention shall be granted under the law.*

*Therefore, this*

### United States Patent

*Grants to the person(s) having title to this patent the right to exclude others from making, using, offering for sale, or selling the invention throughout the United States of America or importing the invention into the United States of America for the term set forth below, subject to the payment of maintenance fees as provided by law.*

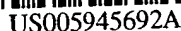
*If this application was filed prior to June 8, 1995, the term of this patent is the longer of seventeen years from the date of grant of this patent or twenty years from the earliest effective U.S. filing date of the application, subject to any statutory extension.*

*If this application was filed on or after June 8, 1995, the term of this patent is twenty years from the U.S. filing date, subject to any statutory extension. If the application contains a specific reference to an earlier filed application or applications under 35 U.S.C. 120, 121 or 365(c), the term of the patent is twenty years from the date on which the earliest application was filed, subject to any statutory extension.*

Acting Commissioner of Patents and Trademarks

  
Attest

JC872 U.S. Pat.  
09/891925  
06/27/01



## Yano et al.

[11] Patent Number: 5,945,692  
[45] Date of Patent: \*Aug. 31, 1999

- [54] SEMICONDUCTOR DEVICE AND METHOD
- 
- OF FABRICATING SAME

- [75] Inventors: **Mitsuhiko Yano; Kouichi Mochizuki,**  
both of Fukuoka, Japan

- [73] Assignee: **Mitsubishi Denki Kabushiki Kaisha,**  
**Tokyo, Japan**

- [ \* ] Notice: This patent issued on a continued prosecution application filed under 37 CFR 1.53(d), and is subject to the twenty year patent term provisions of 35 U.S.C. 154(a)(2).

[21] Appl. No.: 08/432,812

[22] Filed: **May 2, 1995**

[30] **Foreign Application Priority Data**

May 31, 1994 [JP] Japan ..... 6-118386 P

[51] Int. Cl.<sup>6</sup> ..... H01L 29/74

[51] Int. Cl. ....  
[52] U.S. Cl. .... 257/139; 257/212; 257/401;  
257/630; 257/646; 257/649

[58] **Field of Search** ..... 257/139, 212,  
257/341, 401, 630, 646, 649

[56] **References Cited**

## U.S. PATENT DOCUMENTS

4,161,744	7/1979	Blaske et al. ....	357/59
4,364,073	12/1982	Becke et al. ....	357/23
4,814,283	3/1989	Temple et al. ....	437/8
5,196,354	3/1993	Ohtaka et al. .	

5,521,409 · 5/1996 Hsieh et al. .... 257/341

## FOREIGN PATENT DOCUMENTS

0 091 079	10/1983	European Pat. Off.
1-265524	10/1989	Japan .
4-57330	2/1992	Japan .
4-130631	5/1992	Japan .

## OTHER PUBLICATIONS

Patent Abstracts of Japan, vol. 14, No. 408 (E-972) (4351),  
Sep. 4, 1990, and JP 2 153570, Jun. 13, 1990.  
IEEE Transactions on Electron Devices, vol. ED-27, No. 2,  
pp. 340-343, Feb. 1980, Richard W. Coen, et al., "A  
High-Performance Planar Power Mosfet".  
Patent Abstracts of Japan, vol. 11, No. 275 (E-537) (2722),  
Sep. 5, 1987, and JP 62 73766, Apr. 4, 1987.  
Patent Abstracts of Japan, vol. 16, No. 558 (E-1294), Nov.  
27, 1992, and JP 4 212468, Aug. 4, 1992.

*Primary Examiner*—Sara Crane  
*Attorney, Agent, or Firm*—Obalon, Spivak, McClelland,  
Maier & Neustadt, P.C.

[57] **ABSTRACT**

There is disclosed a semiconductor device having an MOS gate for reducing variations in threshold voltage ( $V_{th}$ ) with time wherein a surface protective film is not formed in a device area including channels but only in a device peripheral area, thereby reducing the amount of hydrogen atoms migrating to a silicon-silicon oxide interface in a cell area and, accordingly, reducing the number of Si—H chemical bonds at the interface.

**22 Claims, 11 Drawing Sheets**

